

# **EXHIBIT U**

## Body mass index - BMI

1.6K

BMI, formerly called the Quetelet index, is a measure for indicating nutritional status in adults. It is defined as a person's weight in kilograms divided by the square of the person's height in metres (kg/m<sup>2</sup>). For example, an adult who weighs 70 kg and whose height is 1.75 m will have a BMI of 22.9.

$$70 \text{ (kg)} / 1.75^2 \text{ (m}^2\text{)} = 22.9 \text{ BMI}$$

For adults over 20 years old, BMI falls into one of the following categories.

**Table 1. Nutritional status**

BMI	Nutritional status
Below 18.5	Underweight
18.5–24.9	Normal weight
25.0–29.9	Pre-obesity
30.0–34.9	Obesity class I
35.0–39.9	Obesity class II
Above 40	Obesity class III

The BMI ranges are based on the effect excessive body fat has on disease and death and are reasonably well related to adiposity. BMI was developed as a risk indicator of disease; as BMI increases, so does the risk for some diseases. Some common conditions related to overweight and obesity include: premature death, cardiovascular diseases, high blood pressure, osteoarthritis, some cancers and diabetes.

BMI is also recommended for use in children and adolescents. In children, BMI is calculated as for adults and then compared with z-scores or percentiles. During childhood and adolescence the ratio between weight and height varies with sex and age, so the cut-off values that determine the nutritional status of those aged 0–19 years are gender- and age-specific. The cut-off points of the 2006 BMI-for-age reference for children aged 0–5 years

## History

BMI is very easy to measure and calculate and is therefore the most commonly used tool to correlate risk of health problems with the weight at population level. It was developed by Adolphe Quetelet during the 19<sup>th</sup> century. During the 1970s and based especially on the data and report from the Seven Countries study, researchers noticed that BMI appeared to be a good proxy for adiposity and overweight related problems.

Like any other measure it is not perfect because it is only dependant on height and weight and it does not take into consideration different levels of adiposity based on age, physical activity levels and sex. For this reason it is expected that it overestimates adiposity in some cases and underestimates it in others.

Other measures, such as waist circumference (WC), can complement BMI estimates. Association between WC and health risks is not an easy task and should be done scientifically using proper techniques.

---

[WHO child growth standards \(http://www.who.int/childgrowth/standards/en/\)](http://www.who.int/childgrowth/standards/en/)

[BMI-for-age \(5-19 years\)  
\(http://www.who.int/growthref/who2007\\_bmi\\_for\\_age/en/index.html\)](http://www.who.int/growthref/who2007_bmi_for_age/en/index.html)